

**Abstract**

The invention describes a low temperature method for producing multi-layered or multi-phased coatings. With the technique according to the present invention, surface coatings with controlled variations in terms of chemical composition, phase composition, porosity, surface roughness, mechanical properties, biocompatibility, etc can be achieved. The method of coating a substrate surface comprises the steps of preparing several powder mixtures of different chemical composition containing at least a non-hydrated hydraulic ceramic powder binder phase, pre-treating a substrate surface, to increase the adhesion between the substrate and the ceramic coating, applying said non-hydrated powder mixtures of different chemical composition on the substrate as layers on top of each other, and finally, hydrating the powder layers in a curing agent.